

Algebra 2
Lesson 1: Parent Functions
Mrs. Snow, Instructor

1st pd

Families. How many times have you heard, "You look just like your mother!" or "You certainly see the family resemblance." Maybe you have thought that about your friend who looks exactly like one of the parents. Well, functions have family bonds too. Functions will look like their **parent function**.

Vocabulary

family of functions – a set of functions whose graphs have basic characteristics in common.

parent function – the most basic function in a family; strip away all coefficients, negative signs, constants, etc you get the parent function.

You are expected to know the equation, graph, and domain and range for each of the parent functions

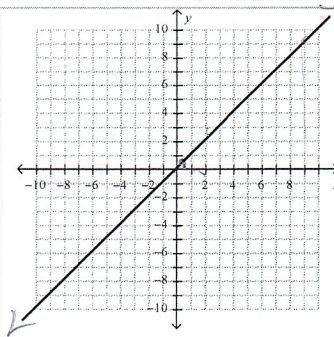
Linear Function: $f(x) = x$

or $y = x$

← function notation

Domain - $\{ \mathbb{R} \}$ (all real #)

Range - $\{ \mathbb{R} \}$ (all real #)



See straight line

$y = 2x - 3$

$\frac{1}{x} \leftarrow x \neq 0$

Absolute Value Function: $f(x) = |x|$

or $y = |x|$

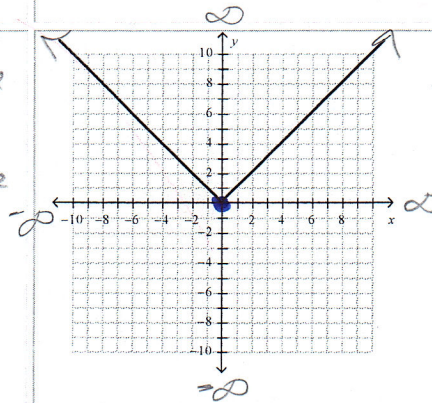
↑ Absolute value

$y = |-5|$
 $y = 5$

A.V. = distance to the origin

Domain $\{ \mathbb{R} \}$

Range $\{ y \mid y \geq 0 \}$
or $y \geq 0$



See "V" shape

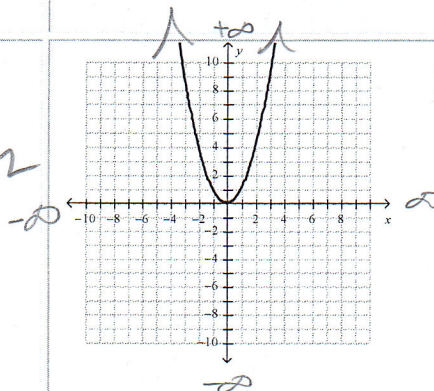
Quadratic Function: $f(x) = x^2$

or $y = x^2$

Variable raised to power of 2

Domain $\{ \mathbb{R} \}$

R: $\{ y \geq 0 \}$



See "U" shape

finish wed

f + 2

Square Root Function: $f(x) = \sqrt{x}$

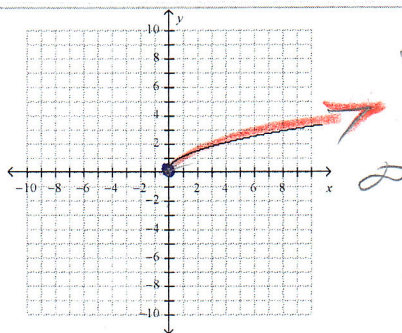
or $y = \sqrt{x}$

$y = \sqrt{0}$
 $= 0$

$\frac{x}{y}$
 $\frac{0}{0}$
-4
 $y = \sqrt{-4}$
No Real solution

D: $x \geq 0$

R: $y \geq 0$



Exponential Function: $f(x) = b^x$

or $y = b^x$ i.e. $y = 2^x$

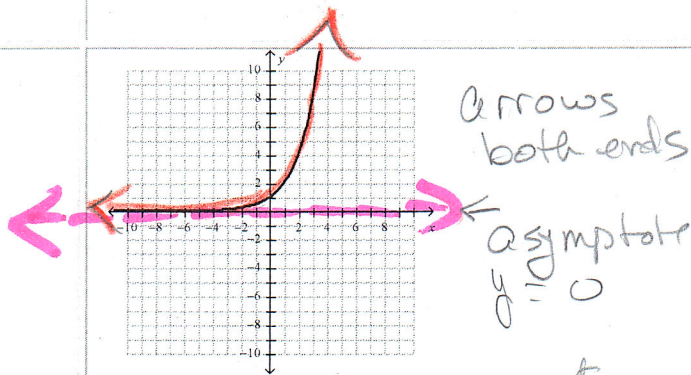
"x" is the exponent

D: All Real

R: $y > 0$ ($y \neq 0$)

examp
 $y = 12^x$

$y = .7^x$

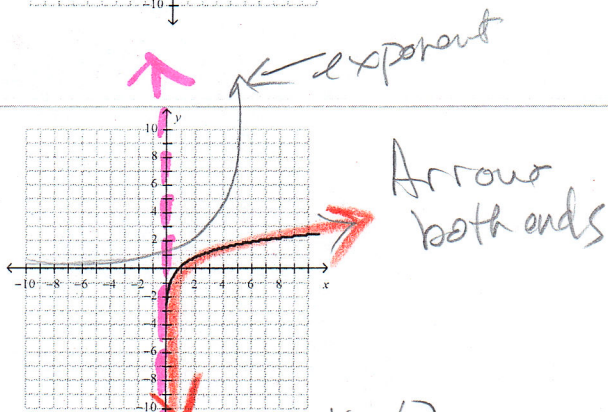


Log Function: $f(x) = \log_b x$

or $y = \log_b x$

D: $x > 0$

R: All Real



Reciprocal Function: $f(x) = \frac{1}{x}$

x is in denominator

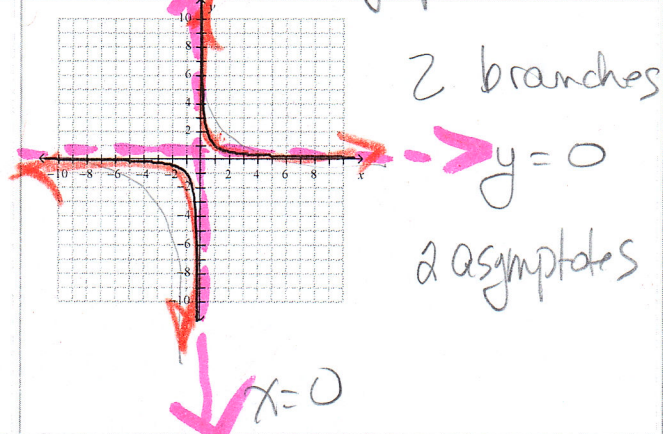
or $y = \frac{1}{x}$

$x = 0$
 $y = \frac{1}{0}$ BAD
undefined

D: $x \neq 0$

R: $y \neq 0$

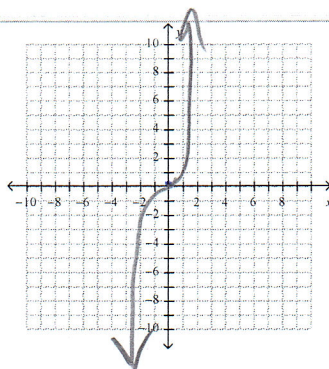
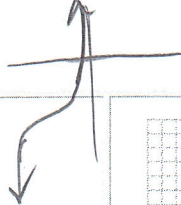
$\frac{1}{10}$
 $\frac{1}{100}$
 $\frac{1}{2000}$



Cubic Function: $f(x) = x^3$

x is cube
3 power

$\mathbb{D} > \mathbb{R}$ All Real



"Snakey" or "S" shape

Identify the parent function, domain and range.

a. $f(x) = \frac{1}{x+2} - 3$

parent - reciprocal
↓
parent $\mathbb{D} \Rightarrow x \neq -2$
 $\mathbb{R} y \neq -3$

b. $g(t) = 5t^2 - 4t + 8$

power of 2 $\therefore$
Quadratic parent

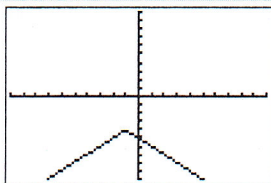
c. $h(z) = 2z + 4$

d. $j(p) = 2|p - 3| + 5$

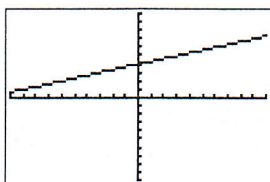
e. $h(x) = 2\sqrt{x}$

f. $g(n) = 2^n + 1$

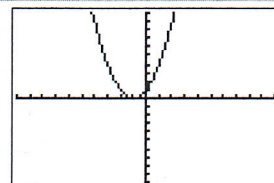
g.



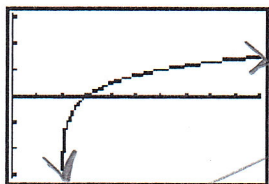
h.



i.



j.



Sq root
log

k.

x	y
-3	5
-2	2
-1	1
0	2
1	5

l.

x	y
-1	1
0	2
1	4
2	8
3	16

m.

x	y
0	-1
1	1
4	3
9	5
16	7